

CLAIMS

1. A process for preparing an in-situ water-soluble zinc salt for use as a base or additive in preparing an automatic dishwashing composition, said process comprising the steps of:
 - a) dispersing zinc oxide in water;
 - b) combining an acid with said zinc oxide/water mixture;
 - c) mixing said zinc oxide/water mixture and said acid until said zinc oxide is at least partially dissolved;
 - d) maintaining said zinc oxide/water/acid mixture within an acidic pH range; and
 - e) combining said zinc oxide/water/acid mixture with at least one rinse aid ingredient to form a rinse aid composition;

wherein the order of addition of said process steps (a) and (b) is not critical.

2. A process according to Claim 1, wherein said zinc oxide/water/acid mixture has a pH of less than about 5.

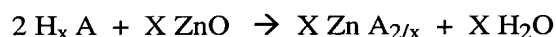
3. A process according to Claim 1, wherein zinc oxide is provided in an amount that will deliver via an automatic dishwashing composition and/or product from about 0.01 mM to about 10 mM of a water-soluble zinc salt compound or product to the wash and/or rinse liquor of an automatic dishwashing appliance during operation.

4. A process according to Claim 3, wherein from about 0.02 mM to about 5 mM of said water-soluble zinc salt compound or product is delivered.

5. A process according to Claim 4, wherein from about 0.05 mM to about 1 mM of said water-soluble zinc salt compound or product is delivered.

6. A process according to Claim 5, wherein from about 0.05 mM to about 0.5 mM of said water-soluble zinc salt compound or product is delivered..

7. A process according to Claim 1, wherein said acid is provided at least in an amount determined stoichiometrically using the formula:



wherein A is an organic and/or an inorganic acid, and x is an integer that varies from 1 to 2.

8. A process according to Claim 1, wherein said acid is selected from the group consisting of acetic acid, aspartic acid, benzoic acid, boric acid, bromic acid, formic acid, gluconic acid, glutamic acid, hydrochloric acid, lactic acid, malic acid, nitric acid, sulfamic acid, sulfuric acid, tartaric acid, and mixtures thereof.

9. A process according to Claim 1, wherein said acid is acetic acid.

10. A process according to Claim 1, wherein said acid is gluconic acid.

11. A process according to Claim 1, wherein said acid is hydrochloric acid.

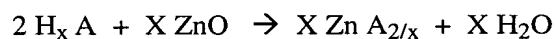
12. A process according to Claim 1, wherein said acid is nitric acid.

13. A process according to Claim 1, wherein a water-soluble zinc salt is prepared in-situ, wherein said salt is selected from the group consisting of zinc acetate, zinc benzoate, zinc borate, zinc bromide, zinc chloride, zinc formate, zinc gluconate, zinc lactate, zinc laurate, zinc malate, zinc nitrate, zinc perborate, zinc sulfate, zinc sulfamate, zinc tartrate, and mixtures thereof.

14. A process according to Claim 1, wherein said in-situ prepared water-soluble salt is zinc acetate.
15. A process according to Claim 1, wherein said in-situ prepared water-soluble salt is zinc gluconate.
16. A process according to Claim 1, wherein said in-situ prepared water-soluble salt is zinc chloride.
17. A process according to Claim 1, wherein said in-situ prepared water-soluble salt is zinc nitrate.
18. A process according to Claim 1, wherein said at least one rinse aid ingredient is selected from the group consisting of an acid, a hydrotrope, a thickener, a binder, a dispersant polymer, a carrier medium, a surfactant, a perfume, a dye, and mixtures thereof.
19. A process for preparing an in-situ water-soluble zinc salt for use as a base or additive in preparing an automatic dishwashing composition, said process comprising the steps of:
 - a) dispersing zinc oxide in water;
 - b) combining an acid with said zinc oxide/water mixture; wherein said acid is selected from the group consisting of acetic acid, aspartic acid, benzoic acid, boric acid, bromic acid, formic acid, glutamic acid, hydrochloric acid, lactic acid, malic acid, nitric acid, sulfamic acid, sulfuric acid, tartaric acid, and mixtures thereof;
 - c) mixing said zinc oxide/water mixture and said acid until said zinc oxide is at least partially dissolved; and

- d) combining said zinc oxide/water/acid mixture with at least one detergent ingredient to form a detergent composition.

20. A process according to Claim 19, wherein said acid is provided at least in an amount determined stoichiometrically using the formula:



wherein A is an organic and/or an inorganic acid, and x is an integer that varies from 1 to 2.

21. A process according to Claim 25 wherein said at least one detergent ingredient is selected from the group consisting of a detergent builder, alkalinity builder, bleach, enzyme, surfactant, defoamer, polymer and mixtures thereof.